

### **CLAIM LISTING**

The following listing of the claims replaces all prior versions and listings of the claims in the application.

1. (currently amended): A catalytic decomposition propulsion system, the system comprising,

a propellant tank for storing a propellant,

~~a control valve for controlling the passage of the propellant, the control valve operating in a first state and a second state, the control valve passing a first amount of propellant in the first state during a first time period and passing a second amount of propellant in a second state during a second time period, the first amount being greater than the second amount, and~~

a decomposition chamber for supporting a catalyst for reacting with the propellant for decomposing the propellant into a gas, and

a control valve positioned between the propellant tank and the decomposition chamber for controlling the passage of the propellant to the decomposition chamber, wherein:

the control valve has an opened state and a closed state,

the control valve passes a first amount of propellant in the opened state during a first time period and passes substantially no propellant in the closed state during a second time period,

the control valve is configured to repeatedly transition between the opened state and the closed state such that a majority of the first amount of the propellant passed through the control valve during the first time period decomposes

during the second time period.

2. (canceled)

3. (currently amended): The system of claim 1 wherein, the control valve is continuously operated between the first opened and second closed states.

4. (canceled)

5. (currently amended): The system of claim 1 wherein, the control valve is configured to transition between the opened and closed states such that ninety percent of the ~~sum of the first amount plus the second amount~~ of the propellant passed through the control valve during the first ~~and second~~ time period decomposes during the second time period.

6. (currently amended): The system of claim 1 wherein, a current rate of decomposition of propellant in the decomposition chamber increases after ~~when~~ the control valve changes from the first opened state to the second closed state.

7. (canceled)

8. (canceled)

9. (original): The system of claim 1 further comprising, an injector manifold

deposited between the decomposition chamber and the flow control valve, the injector manifold having a plurality of injector orifices for distributing the propellant into the decomposition chamber.

10. (original): The system of claim 1 further comprising, a recirculation tube for routing a portion of the gas into the injector manifold for pushing the propellant into the decomposition chamber.

11. (original): The system of claim 1 further comprising, a nozzle for exhausting the gas from the decomposition chamber.

12. (original): The system of claim 1 further comprising,  
a nozzle for exhausting the gas from the decomposition chamber, the nozzle having convergent portion, divergent portion and a throat portion, and  
a throat valve disposed in the throat portion for controlling the rate of exhaust of the gas from the decomposition chamber.

13. (original): The system of claim 1 further comprising, an injector inlet for passing the propellant from the control valve into the decomposition chamber.

14. (original): The system of claim 1 further comprising, a distribution manifold disposed between the propellant tank and the control valve, and a flow control orifice disposed in the distribution manifold for limiting the flow of the propellant into the decomposition chamber.

15. (original): The system of claim 1 wherein, the propellant is a monopropellant.

16. (original): The system of claim 1 wherein, the propellant comprises hydroxyl ammonium nitrate.

17. (currently amended): A catalytic decomposition propulsion system, the system comprising,

a propellant tank for storing a propellant,

a decomposition chamber for supporting a catalyst for reacting with the propellant for decomposing the propellant into a gas,

a control valve positioned between the propellant tank and the decomposition chamber for controlling the passage of the propellant to the decomposition chamber, the control valve operating in a first opened state and a second closed state, the control valve passing a first amount of propellant in the first opened state during a first time period and passing ~~a second amount of~~ substantially no propellant in a second the closed state during a second time period, ~~the first amount being greater than the second amount,~~

~~a decomposition chamber for supporting a catalyst for reacting with the propellant for decomposing the propellant into a gas, and~~

an injector manifold disposed between the decomposition chamber and the flow control valve, the injector manifold having a plurality of injector orifices for distributing the propellant into the decomposition chamber, and

a nozzle for exhausting the gas from the decomposition chamber, the nozzle having convergent portion, divergent portion and a throat portion, wherein:

~~the first state is an opened state;~~

~~the second state is a closed state;~~

~~the second amount of propellant passed through the control valve during the second time is zero;~~

the valve is continuously operated between the first opened and second closed states such that a majority of the first amount of the propellant passed through the control valve during the first time period decomposes during the second time period;

~~a majority of the sum of the first amount plus the second amount of the propellant passed through the control valve during the first and second time period decomposes during the second time period; and~~

a current rate of decomposition of propellant in the decomposition chamber increases after ~~when~~ the control valve changes from the first opened state to the second closed state.

18. (original): The system of claim 17 further comprising, a recirculation tube for routing a portion of the gas into the injector manifold for pushing the propellant into the decomposition chamber, a throat valve disposed in the throat portion for controlling the rate of exhaust of the gas from the decomposition chamber.

19. (canceled)

20. (original): The system of claim 17 wherein, the propellant comprises hydroxyl ammonium nitrate.

21. (new): The system of claim 1, wherein the decomposition chamber comprises a plurality of chamber beds, wherein a first chamber bed selected from the plurality of chamber beds comprises catalyst particles of a first size and a second chamber bed selected from the plurality of chamber beds comprises catalyst particles of a second size, and wherein the first chamber bed is closer to the control valve than the second chamber bed, and wherein the first size is larger than the second size.

22. (new): The system of claim 21, wherein each of the plurality of chamber beds comprises catalyst particles of a different size, and wherein the sizes of the catalyst particles in plurality of chamber beds decreases in the direction of flow from the control valve to a nozzle.

23. (new): The system of claim 17, wherein the decomposition chamber comprises a plurality of chamber beds, wherein a first chamber bed selected from the plurality of chamber beds comprises catalyst particles of a first size and a second chamber bed selected from the plurality of chamber beds comprises catalyst particles of a second size, wherein the first chamber bed is closer to the control valve than the second chamber bed, and wherein the first size is larger than the second size.

24. (new): The system of claim 23, wherein each of the plurality of chamber beds comprises catalyst particles of a different size, and wherein the sizes of the catalyst particles in plurality of chamber beds decreases in the direction of flow from the control valve to a nozzle.